REMARKS

This Amendment responds to the Office Action dated July 26, 2005 in which the Examiner rejected claims 1-4 and 10-11 under 35 U.S.C. §103.

As indicated above, Claim 1 and 3 have been amended to make explicit what is implicated in the claims. The amendment is unrelated to a statutory requirement for patentability.

Claim 1 claims a semiconductor light emitting device comprising a mesa section and an inorganic insulating film. The mesa section has at least a sandwich structure of an n-type clad layer, an active layer and a p-type clad layer which are constituted by compound semiconductor layers formed on a substrate. The inorganic insulating film has a porous area defined by cylindrical vacancies so as to cover the mesa section excluding a contact region. The inorganic insulating film has a vacancy rate of 50% or more while being oriented substantially in parallel with a surface of the substrate, and the vacancies are arranged at periodic intervals.

Through the structure of the claimed invention having an inorganic insulating film a) having a porous area defined by cylindrical vacancies, b) having a vacancy rate of 50% or more while being oriented substantially in parallel with a surface of the substrate and c) having the vacancies arranged at periodic intervals, as claimed in claim 1, the claimed invention provides a semiconductor light emitting device having a reduced pad capacity and increased modulating speed. The prior art does not show, teach or suggest the invention as claimed in claim 1.

Claims 1-4 and 10-11 were rejected under 35 U.S.C §103 as being unpatentable over *Iwano et al.* (U.S. Patent No. 5,621,750) in view of *Mandal* (U.S. Patent No. 6,559,070).

Iwano et al. appears to discloses a surface emission type semiconductor laser for emitting light in a direction perpendicular to the plane of a substrate. (Col. 1, lines 8-10) As shown in FIG. 1, the semiconductor laser 100 comprises a substrate 102 of n-type GaAs, a distributed-Brag reflection type multilayer film mirror (hereinafter called "DBR mirror") 103 including 40 pairs of an n-type $Al_{0.8}$ $Ga_{0.2}$ As layer and an n-type $Al_{0.15}$ $Ga_{0.85}$ As layer alternately deposited one above another, and having a reflectivity of 99.5% or more relative to light having a wavelength equal to about 800 nm, a first clad layer 104 of n-type $Al_{0.7}$ $Ga_{0.3}$ As, a quantum well active layer 105 (which is of multiple quantum well (MQW) structure in this embodiment) including twenty-one pairs of an n^--type GaAs well layer and an n^--type $Al_{0.3}$ $Ga_{0.7}$ As barrier layer, a second clad layer 106 of p-type $Al_{0.7}$ $Ga_{0.3}$ As and a contact layer 109 of p^+-type $Al_{0.15}$ $Ga_{0.85}$ As, these layers being sequentially deposited on the substrate 102 in such an order as described. The contact layer 109 and the upper portion of the second clad layer 106 are etched into a cylindrical column-like portion 114 (hereinafter called "resonator portion", the resonator portion need not necessarily be cylindrical as will be explained later in this text). The resonator portion 114 is buried with a first insulation layer 107 of silicon oxide film (SiO_x film) such as SiO_2 or the like and a second insulation layer 108 of heat-resistant resin such as polyimide or the like. (Col. 14, lines 44-67) The first insulation layer 107 formed of silicon oxide film (SiO_x film) shown in FIG. 1 has a film thickness of 500 to 2000 Angstroms. The second insulation layer 108 of heat-resistant resin or the like is required to flatten the surface of the element. However, for example, when heat-resistant resins is used heat-resistant resins tend to include residual moisture in the film, and when an element is operated for a long time while such a heat-resistant resin is in direct

contact with the semiconductor layer, voids will be produced at the interface between the heat-resistant resin and the semiconductor layer to degrade the characteristics of the element. When a thin film such as the first insulation layer 107 is inserted into the interface between the heat-resistant resin and the semiconductor layer according to one embodiment, the first insulation layer 107, in addition to other advantages, serves as a protective film to prevent such a degradation. (Col. 15, line 55 through Col. 16, line 3)

Thus, *Iwano et al.* merely discloses a first insulation layer 107 and a second insulation layer 108. Nothing in *Iwano et al.* shows, teaches or suggests an inorganic insulating film a) having a porous area defined by cylindrical vacancies, b) having the vacancies oriented substantially in parallel with a surface of a substrate and c) having the vacancies arranged at periodic intervals as claimed in claim 1. Rather, *Iwano et al.* merely discloses first and second insulation layers 107, 108.

Mandal appears to disclose a process for depositing dielectric layers on a substrate. (Col. 1, lines 8-9) In order to further reduce the size of devices on integrated circuits, it has become necessary to use conductive materials having low resistivity and insulators having low dielectric constants (k, wherein $k<4.0$) to reduce the capacitive coupling between adjacent metal lines. (Col. 1, lines 20-24) There remains a need for a process to deposit ion diffusion resistant low k dielectric materials with high substrate throughput. (Col. 3, lines 13-15) A method and apparatus are provided for depositing a mesoporous silicon oxide layer having a low dielectric constant. In accordance with one aspect a process is provided for depositing a mesoporous oxide layer having a low dielectric constant and a high phosphorus content. (Col. 5, lines 26-31) The mesoporous oxide film will have a

porosity of al least 50% and a dielectric constant between about 1.6 and about 2.2. The mesoporous film may also be used as a inter-metal dielectric layer. It is believed that the phosphorus doping advantageously provides the combined benefits of ion mobilization, acceleration of deposited hydrolysis completion and condensation, and improved film strength. (Col. 5, lines 45-52)

Thus, *Mandal* merely discloses a film having a porosity of at least 50%. However, nothing in *Mandal* shows, teaches or suggests a) a porous area defined by cylindrical vacancies, b) vacancy being oriented substantially in parallel with a surface of the substrate and c) vacancies arranged at periodic intervals as claimed in claim 1. Rather, Figure 13 of *Mandal* merely discloses a film having porosity that is randomly distributed.

Since neither *Iwano et al.* or *Mandal* show, teach or suggest a) a porous area defined by cylindrical vacancies, b) vacancies oriented substantially in parallel with a surface of the substrate and c) vacancies arranged at periodic intervals as claimed in claim 1, Applicants respectfully request the Examiner withdraws the rejection to claim 1 under 35 U.S.C. §103.

Claims 3-4 and 10-11 depend from claim 1 and recite additional features. Applicants respectfully submit that claims 3-4 and 10-11 would not have been obvious within the meaning of 35 U.S.C. §103 over *Iwano et al.* and *Mandal* at least for the reasons as set forth above. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claims 3-4 and 10-11 under 35 U.S.C. §103.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested. Should the Examiner find that the application is not now in condition for

allowance, Applicants respectfully request the Examiner enters this Amendment for purposes of appeal.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is requested to contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

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Date: November 23, 2005

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